REMARKS

Status of the Claims

The limitation of claims 3 and 15 have been incorporated into claim 1 (claims 3, 4, 6, 15 and 16 have resultingly been cancelled). Claim 7 has been amended to correct a typographical error. Entry of the amendment is believed to reduce the number of issues for any potential Appeal Brief and does not raise new issues as there limitations were part of dependent claims previously considered by the Examiner.

Claims 1, 5, 7, 8, 10-13, 17 and 18 are still pending. It is believed that no new matter has been added.

35 U.S.C. § 112, first paragraph rejection

(1) The applicants attach to this response, copies of the references cited with respect to the terms "average roughness R_a" and "average depth of roughness R_z". The portion from the applicants previous response is reproduced below:

"The Examiner is correct that the terms 'average roughness Ra' and 'average depth of roughness R_z'; are defined with reference DIN 4768.

Annexed hereto the Examiner will find copies of the following documents:

1. Hommel Tester T500 - Technical specifications, which indicates surface evaluation parameters R_a and R_z, measured according to DIN 4768 and ISO 4287 (thereby indicating that DIN 4768 corresponds to ISO 4287);
2. CARSGALS Catalog 457010 ("CRSEALS") – Shaft requirements, which refers to R_z (DIN 4768), provides an illustration and formula
3. TECHNISCHE DARSTELLUNG, UNIVERSITÄT SIEGEN, which provides drawings and formulae of both R_z and R_a (obtained over the Internet). As this is written in German, a brief translation is in order:
   (a) "Ermittlung der Rauheitskenngrößen R_a, R_z, R_{max} mit elektrischen Tastschnittgeräten (Auszug)" - Determination of roughness R_a, R_z, R_{max} with electric test device (Abstract)
   (b) "Bild 1: Arithmetischer Mittenrauwert R_a" - Figure 1: average roughness R_a

(c) "Bild 2: Gemittelte Rautiefe R_z - Figure 2: average depth of roughness (average peak to valley height) R_z

(d) "Vorlaufstrecke" - start-up length

(e) "Nachlaufstrecke" - stop length

From these documents, the Examiner will see that the expressions 'average roughness R_a' and 'average depth of roughness R_z' are well-known to those skilled in the art, and their precise meaning is known from the international standard DIN 4768.

The definition of said terms is therefore well known, and the objection to the specification should be withdrawn.

While the applicants are perfectly willing to submit the above information, even in its absence, it is noted that this merely confirms what is already known by those of ordinary skill in the art, i.e. there is no new description or clarification of the applicants invention.

(2) The applicants are unclear as to the basis for the Examiner's rejection with regard to the previous inclusion of the phrase "according to Figure 2a" as in the first action on the merits, this portion of the rejection was included as part of a written description rejection but in the final rejection, the Examiner held that it was "...still clearly non-enabling."

Regardless of which rejection was intended, there was never a figure 2a as part of the application and this typographical error was deleted. One of ordinary skill in the art would be able to figure out that the plates described in Example B were produced in the manner described in Example A with the only difference being that four different roughnesses were set as is indicated in the "Result" table on page 10 and that specimen 2a corresponds to 2a cited in the "Result" table of Example A. Given the high burden placed on the Examiner to establish lack of written description (MPEP 2163 - "There is a strong presumption that an adequate written description of the claimed invention is present when the application is filed or lack of enablement") and for establishing lack of enablement (MPEP 2164.01(a) - consideration of the *Wands* factors), the applicants hold that the claims are adequately described and enabled.

35 U.S.C. § 112, second paragraph rejection

The applicants have corrected the typographical error for claim 7. After reviewing the IFW for this application, the Examiner is correct about the errors in spelling with regard to claims 11 and 18. However, this error appears to have occurred during the facsimile process as the applicants' file copy of the amendment faxed to the Examiner on 2 February 2004 does not contain the alleged typographical errors, i.e. there was no intended amendment for these terms as they were previously presented in the second preliminary amendment of 28 February 2002.

35 U.S.C. 103(a) rejections

Claims 1, 3-13 and 15-18 were rejected as being obvious over Lühmann et al. (U.S. Patent 6,136,397 - hereafter referred to as "Lühmann").

The applicants and the Examiner appear to have a fundamental disagreement as to whether a *prima facie* case of obviousness have been made with respect to Lühmann. The applicants respectfully submit that such a case has not been made.

The ultimate determination whether an invention would have been obvious under 35 U.S.C. § 103 is a legal conclusion based on underlying findings of fact (see *In re Kotzab*, 217 F.3d 1365, 1369, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000). As the Examiner acknowledges, the applicants' claimed invention differs from Lühmann with respect to the range of average roughness. However, the Examiner attempts to establish equivalency between the disclosure in Lühmann of "low stick and slip friction" and the applicants' teaching of average roughness. However, there is no factual basis which supports the Examiner's beliefs and suppositions about this type of equivalency.

Lühmann's later disclosure that reduction of frictional forces can be achieved by use of a low-energy plastic surface appears at best to be unrelated to the applicants' current teaching of roughness in their claimed self-adhesive device and is more likely to be viewed as a teaching away as Lühmann appears to indicate a teaching towards reducing roughness rather than introducing roughness in Lühmann's claimed device, i.e. as previously stated, use of low-energy plastic surfaces appears to direct one of ordinary skill in the art to the use of smoother surfaces.

Even if equivalency between "low stick and slip friction" and the applicants average roughness

could have been established, the applicants' broadest claim establishes a distinct limitation with regard to the range of average roughness, R_a and there is no factual evidence that supports the proposition that this range is overlapped or would be rendered obvious given the teachings of Lühmann.

In addition, MPEP 2143.03 states that "To establish *prima facie* obviousness of a claimed invention, all claim limitations must be taught or suggested by the prior art." (see also *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)). The applicants already have asserted that claim 1 is unobvious over the prior art, but this would also extend to the various limitations of the dependent claims are even further removed from the Lühmann reference, i.e. Lühmann does not teach or suggest (1)average roughness R_a is 2-20 μm (claim 3 - an even narrower range); (2) has an average depth of roughness R_z of 1-150 μm (claim 4); (3) average roughness R_a is produced together with the device by injection molding, or is produced by etching, grinding, embossing or spark erosion (claim 5); (4) the width of the area having the average roughness R_a corresponds to or exceeds the width of the adhesive strip, and has a depth of 0.5-20 mm (claim 6), etc.

With regard to the Examiner's suggestion that the various limitations are expressly or inherently disclosed, the Examiner has already outlined what has been expressly disclosed and found that several limitations were left wanting in the Lühmann reference and if it is felt that some of the limitations are inherent, it is well known that "...the inherency of an advantage and its obviousness are entirely different questions. That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown." *In re Spormann*, 363 F.2d 444, 448, 150 USPQ 449, 452 (CCPA 1966).

With regard to the Examiner's assertion that even if the various limitations are not expressly or inherently disclosed, that they are "...believed to be...obvious modifications to one of ordinary skill [in the art]...", there again does not appear to be any factual basis for such an assertion. It is well known that when the USPTO relies on an express or an implicit show of motivation, it must provide particular findings related to its conclusions, and the showing must be clear and particular. Broad conclusionary statements standing alone are not "evidence". see *In re Dembiczak*, 175 F.3d 994, 999, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

With regard to the other Lühmann references cited (i.e. U.S. Patents 6,004,665 and 5,897,949), these teachings only serve to confirm that those skilled in the art had had a difficult time in achieving sufficient bond strength between an adhesive composition and a rough surface to which the composition is applied. However, it is unclear from the Lühmann references whether this problem was solved by their

the applicants. Only the applicants' claimed invention specifically directs one of ordinary skill in the art to produce the adhesive composition/device with the requisite amount of average roughness.

Lastly, the applicants' also point to the data presented in page 10 of the specification ("evidence of secondary considerations"), i.e. by properly adjusting the average roughness (R_a) and average depth of roughness (R_z) within the applicants claimed ranges, the applicants were able to reduce the tear frequency to unexpectedly low levels. None of the Lühmann references suggests what the applicants have been able to accomplish.

For these reasons, it is believed that pending claims are unobvious over the Lühmann references.

Closing

Applicants also believe that this application is in condition for immediate allowance. However, should any issue(s) of a minor nature remain, the Examiner is respectfully requested to telephone the undersigned at telephone number (212) 808-0700 so that the issue(s) might be promptly resolved.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that the foregoing Amendment under 37 CFR § 1.116 (8 pages total) is being facsimile transmitted to the United States Patent and Trademark Office on the date indicated below:

Date: **6 August 2004**

By: Agata Glinska
Agata Glinska

HOMMEL _WERKE

HOMMEL TESTER T500 – Technical specifications

HOMMEL TESTER T500				
Surface evaluation parameters	Ra, Rz, DIN, Rmax as per DIN 4768 and ISO 4287/1 Ra, Rz, ISO, Rt as per ISO 4287/1 Ra, Rz, JIS, Rmax JIS as per Japanese standard JIS B601 Pc as per Euro standard 49 ANSI/ASME B 46.1 OPTION : Rpk*, Rk, Rvk, Rvk*, Mr1, Mr2 as per DIN 4776/ISO 13565 * Option applicable for devices without Datasave function.			
Tolerance display for Ra, Rz, Rmax or Rt				
Cut-off lengths λc	λc (mm)	0,25	0,8	2,5
Scanning distances as per DIN 4768 and ISO 4287/1	lt (mm)	1,5	4,8	15,0
Individual measurement distances lr	1-5 selectable			
Scanning speed Vt	Vt (mm/s)	0,15	0,5	1,0
The 0.25 mm and 0.8 mm cut-offs can be freely assigned to any scanning distance.				
Digital filter	Profile filter M1 phase corrector as per DIN 4777/ISO 11562			
Measurement range	MR	Measurement travel	Resolution	
	1	+20/- 20µm	10 nm	
		+20/- 60µm	20 nm	
	2	+40/- 40µm	20 nm	
		+40/- 120µm	40 nm	
Precision category	Class 1 as per DIN 4772			
Smallest display value	0,01 µm			
Probe position indicator	bar indicator and numerical value			
Measurement system	µm and µinch			
Interface	Standard V24 (RS232), serial			
Power supply	9 V replaceable battery with plug-in mains adapter			
Measurement capacity	approx. 80 measurements at lt = 4,8 mm (per battery charge)			
Dimensions (length x width x height)	118 mm x 56 mm x 62 mm			
Weight	330 g			
T5E PICK-UP				
Measurement principle	inductive, carrier frequency 10 kHz			
Diamond scanning tip	radius 5 µm as per DIN 4772			
Support strength in 0 position	1,6 mN			
Tip angle	90 degrees as per DIN 4772			
Skid radius	length 30 mm, transverse 1,9 mm			
From hole diameter	4,0 mm, depth 20,0 mm			
HOMMEL PRINTER P510				
Printer type	Thermal graphics printer			
Print speed	30 mm/s			
Font size	2,4 x 1,3 mm			
Print width	46 mm			
Paper size	Paper roll ø 30 mm (paper length approx.10 m), width 57 mm			
Keyboard	Touch sensitive keyboard with 3 keys (oil resistant)			
Interface	T500 connector cable, mains connection adapter			
Paper feed	via roller in paper shaft			
Recommended operating temperature (for optimum print quality)	+10 ... +35°C			
Dimensions (width x height x depth)	42 mm x 48 mm x 135 mm			
Weight	approx. 600 g			
Supply voltage	100 ~ 240 V			
Battery load cycle	approx. 2,5 hrs. (discharge and over-charge protection)			
Battery capacity	1500 mAh			

Subject to change without notice.

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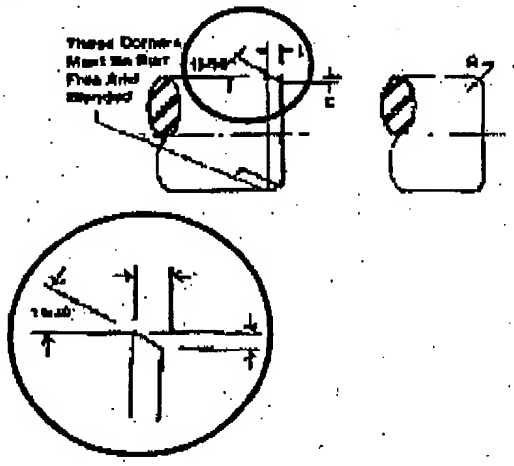
Shaft Configurations

A burr-free chamfer or radius is required as illustrated below (C = chamfer depth).



Shaft Diameter

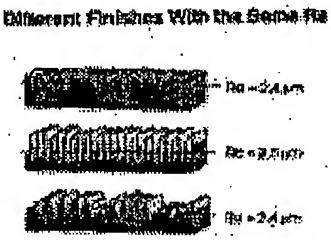
Shaft Diameter (Inches)	C	R	Preferred L@15°	Optional L@30°
Up to 4.000	.093	.188	.347	.156
4.001 to 7.000	.125	.250	.466	.218
7.001 to 40.000	.188	.375	.702	.323
40.001 and larger	.250	.500	.933	.433

Shaft Diameter (Millimeters)	C	R	Preferred L@15°	Optional L@30°
Up to 100.0	2.5	4.5	8.5	4.0
100.1 to 180.0	3.0	6.0	11.5	5.0
180.1 to 1000.0	5.0	9.5	18.0	8.0
1000.1 and larger	6.5	12.7	24.0	11.0

Shaft Material/Finish/Hardness

Seals perform best on medium to high carbon steel (SAE 1035, 1045) or stainless steel. Soft shafts with good chrome-plated or nickel-plated surfaces, properly finished, are also acceptable. Soft materials such as brass, zinc, aluminum, magnesium or plastics are not recommended except at low surface speeds (less than 0.50 M/S 100 FPM) and clean environments. Shafts should be hardened to Rockwell C30 or higher to prevent handling damage or abrasive wear.

For optimum sealing performance, new industry research recommends that seal countersurfaces should be plunge ground to 9-17 micro inches RA roughness (0.23-0.43 micro-meters) with a machine lead angle of 0±0.05 degrees. However, shaft finish may still be a cause of seal failure even when this standard is held within the limit. This is because Ra does not describe the surface profile. Within the same Ra value, the shaft surface may have very different profiles.



To fully characterize the shaft surface, two additional parameters should be observed:

Rz (DIN) --Average peak to valley height.
The arithmetic average of the maximum peak-to-valley height of roughness values Z1 to Z5 within five consecutive sampling lengths (le) over the assessment length of the filtered profile. (According to DIN 4768/1)

$$R_z = \frac{1}{5}(Z1 + Z2 + Z3 + Z4 + Z5)$$

Rpm - Average peak to mean height.
The arithmetic average value of the five singles highest peaks above the mean line Rp1-Rp5, similar to the Rz (DIN) definition specified in DIN 4768. (According to DIN 4762/1E, ISO/DIS 4287/1)

$$Rpm = \frac{1}{5}(Rp1 + Rp2 + Rp3 + Rp4 + Rp5)$$

The Shaft Requirements-(Cont.)

CR SEALS

Further, to avoid distortions of the measurement, the cut-off or assessment length has been shortened from 0.762mm (.030 inch) to .254mm (.010 inch). An M1 filter should be used. The new standard also specifies a shaft lead of: <0±0.05 degrees as well as other critieria as shown in the chart below:

Shaft Recommendations for Non-Hydrodynamic Seals

	Shaft Manufacturing Methods				
	Plunge Ground				
Shaft Lead	<0±0.05	<0±0.05	<0±0.05	<0±0.05	<0±0.05
Grinding Chatter	No grinding chatter allowed > 45 cycles				
Roundness	Out of Roundness must be less than 0.00508 mm (0.0002 inch) and a minimum number of lobes.				
Lobing	Maximum of 7 lobes at 0.00254 mm (0.0001 inch)				
Surface Finish	Ra=.20-.43µm (8-17µin) & Rz (din)=1.65-2.90µm (65-115µin) & pm=0.50-1.25µm(20-50µin) M1 filter & 0.254mm(0.010 in) Cutoff				

Significantly, hydrodynamic seals were found to be less sensitive to shaft lead and finish. The study group of 204 seals included 110 CR Waveseals. There were no failures of the Waveseals while 88 of 94 plain trimmed lips experienced failure.

Shaft Eccentricity

Two types of shaft eccentricity affect seal performance; both must be considered.

- SHAFT-TO-BORE MISALIGNMENT (STBM) - The amount by which the shaft is off center, with respect to the bore's center. Shaft-to-bore misalignment is caused by machining and assembly inaccuracies. To measure, attach a dial indicator to the shaft (between the shaft and bore), rotate the shaft and read the indicator. STBM is half of the Total Indicator Reading (TIR).
- DYNAMIC RUN-OUT (DRO) - The amount by which the shaft does not rotate around the true center. Misalignment, shaft bending, lack of shaft balance and other manufacturing inaccuracies are common causes. To measure, slowly rotate the shaft and read the total movement (TIR) of a dial indicator attached to the bore and held against the side of the shaft.

For specific limitations, see the Recommended Operating Conditions Charts for small diameter seals (page 16A) and large diameter seals (page 18A).

Shaft Speed

Maximum speeds for effective seal operation depend on shaft finish, pressure, temperature, eccentricity, lubricant or fluid being retained, seal type and other conditions. For example, shaft speeds may be increased when shaft finish is improved or eccentricity (dynamic run-out) is reduced.

Surface speed at the contact point between the seal and shaft expressed in FPM (feet per minute) generally is a better measure for seal selection than RPM (revolutions per minute) See chart on pg. 363 for conversions. For maximum speeds by seal type, refer to the charts on pgs. 16A-19A.

Shaft Tolerance

For satisfactory sealing performance, be sure the shaft diameter is within the following RMA and ISO recommended tolerances.

Inches

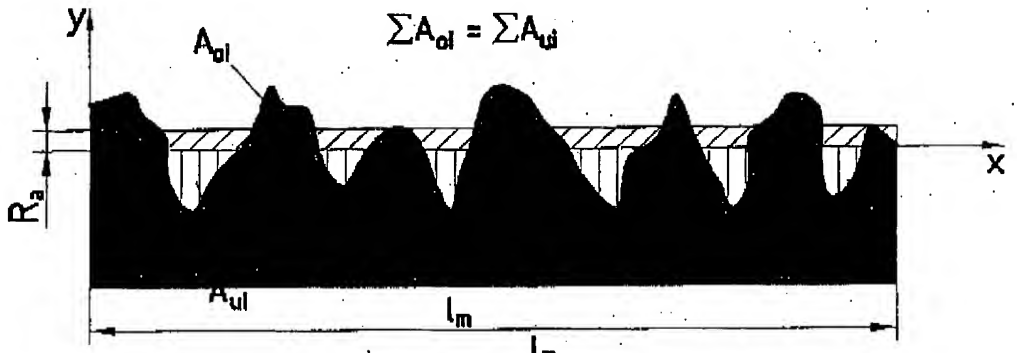
Up to and including 4.000	±.003
4.001 to 6.000	±.004
6.001 to 10.000	±.005
10.001 and larger	±.006

Millimeters

Nominal Shaft Diameter (ISO h11)	Tolerance
Over 6 to 10	+ 0.000 - 0.090
Over 10 to 18	+ 0.000 - 0.110
Over 18 to 30	+ 0.000 - 0.130
Over 30 to 50	+ 0.000 - 0.160
Over 50 to 80	+ 0.000 - 0.190
Over 80 to 120	+ 0.000 - 0.220
Over 120 to 180	+ 0.000 - 0.250
Over 180 to 250	+ 0.000 - 0.290
Over 250 to 315	+ 0.000 - 0.320
Over 315 to 400	+ 0.000 - 0.360
Over 400 to 500	+ 0.000 - 0.400
Over 500 to 630	+ 0.000 - 0.440
Over 630 to 800	+ 0.000 - 0.500
Over 800 to 1000	+ 0.000 - 0.560
Over 1000 to 1250	+ 0.000 - 0.660
Over 1250 to 1600	+ 0.000 - 0.780

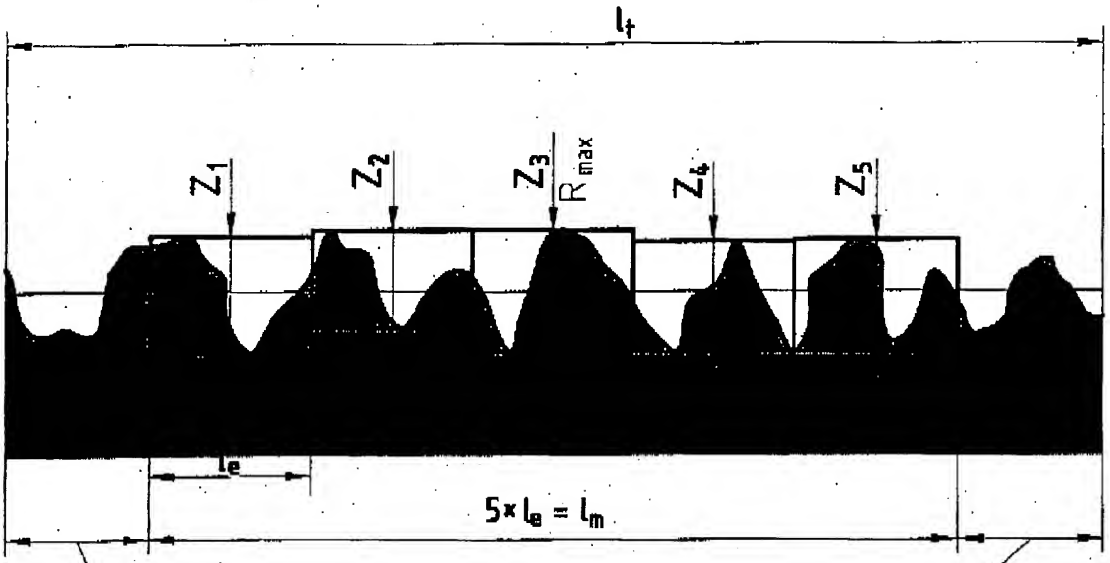
DIN EN ISO 4287: Ermittlung der Rauheitskenngrößen R_a, R_z, R_{max} mit elektrischen Tastschnittgeräten (Auszug)

Begriffe, Messbedingungen



$$R_a = \frac{1}{l_m}\int_0^{l_m} |y(x)|\,dx$$

Bild 1: Arithmetischer Mittenrauhwert R_a



$$R_z = \frac{1}{5}(Z_1+Z_2+Z_3+Z_4+Z_5)$$

Bild 2: Gemittelte Rauhtiefe R_z

UNIVERSITÄT SIEGEN FB 11 MASCHINENTECHNIK INSTITUT FÜR KONSTRUKTION	**Technische Darstellung 1** Technische Oberflächen - Rauheitskenngrößen	HORST TD1-06.01.3